

**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1 – 13. (Canceled)

14. (Currently Amended) A fluorescent silica-based nanoparticle comprising a fluorescent organic dye covalently conjugated to an organo-silane compound, wherein the fluorescent silica-based nanoparticle is ~~conjugated to a ligand and~~ has a diameter from about 20 ~~[[4]]~~ nm to about 200 ~~[[150]]~~ nm and is conjugated to a ligand.

15. (Canceled)

16. (Currently Amended) The fluorescent silica-based nanoparticle of claim 14, wherein the fluorescent silica-based nanoparticle has a diameter from about 25 ~~[[4]]~~ nm to about 100 ~~[[10]]~~ nm.

17. (Currently Amended) The fluorescent silica-based nanoparticle of claim 14, wherein the ligand is positioned on an external surface of the fluorescent silica-based nanoparticle.

18 – 21. (Canceled)

22. (Currently Amended) The fluorescent silica-based nanoparticle of claim 14, further comprising a mercapto group.

23. (Currently Amended) The fluorescent silica-based nanoparticle of claim 14, further comprising a silica shell surrounding at least a portion of the external surface of the fluorescent silica-based nanoparticle.

24. (Canceled)

25. (Currently Amended) The fluorescent silica-based nanoparticle of claim 14, wherein the fluorescent quantum yield of the fluorescent organic dye in the nanoparticle is about two-fold to about three-fold ~~at least 25%~~ greater than the fluorescent quantum yield of the same fluorescent organic dye free in aqueous solution.

26. (Currently Amended) A fluorescent silica-based nanoparticle comprising:

a silica-based core comprising a mercapto group;  
a fluorescent compound positioned within the silica-based core; and  
a silica shell surrounding at least a portion of the core, wherein the fluorescent silica-based nanoparticle is conjugated to a ligand and comprises a diameter between about 20 nm 10.0 nanometers and about 200 nm 150.0 nanometers and is conjugated to a ligand.

27. (Canceled)

28. (Currently Amended) The fluorescent silica-based nanoparticle of claim 26, wherein the diameter is between about 25 nm 10.0 nanometers and about 100 nm 25.0 nanometers.

29. (Currently Amended) The fluorescent silica-based nanoparticle of claim 26, wherein a diameter of the core is between about 10 nm 10.0 nanometers and about 200 nm 25.0 nanometers and a diameter of the shell is between about 25.0 nanometers and about 150.0 nanometers.

30. (Currently Amended) The fluorescent silica-based nanoparticle of claim 26, wherein the fluorescent quantum yield of the fluorescent organic dye in the nanoparticle is about two-fold to about three-fold at least 25% greater than the fluorescent quantum yield of the same fluorescent organic dye free in aqueous solution.

31. (Currently Amended) The fluorescent silica-based nanoparticle of claim 26, wherein the fluorescent compound is an organic fluorescent compound covalently conjugated to the core.

32. (Currently Amended) The fluorescent silica-based nanoparticle of claim 26, wherein the ligand is positioned on an external surface of the nanoparticle.

33. (Currently Amended) The fluorescent silica-based nanoparticle of claim 26, wherein the mercapto group is bonded to a maleimide.

34. (Currently Amended) A fluorescent silica-based nanoparticle comprising:  
a silica-based core comprising a diameter between about 10 nm 10.0 nanometers and about 300 nm 200.0 nanometers;  
a fluorescent compound positioned within the silica-based core; and

a silica shell surrounding at least a portion of the core, ~~the silica shell comprising a diameter between about 25.0 nanometers and about 500.0 nanometers~~, wherein the fluorescent silica-based nanoparticle is conjugated to a ligand.

35. (Currently Amended) The fluorescent silica-based nanoparticle of claim 34, wherein the ~~[[a]]~~ diameter of the core is between about 10 nm ~~10.0 nanometers~~ and about 200 nm ~~25.0 nanometers~~ and ~~a diameter of the shell is between about 25.0 nanometers and about 100.0 nanometers.~~

36. (Currently Amended) The fluorescent silica-based nanoparticle of claim 34, wherein the fluorescent compound is an organic fluorescent compound covalently conjugated to the core.

37. (Currently Amended) The fluorescent silica-based nanoparticle of claim 34, wherein the ligand is positioned on an external surface of the nanoparticle.

38. (Currently Amended) The fluorescent silica-based nanoparticle of claim 34, wherein the silica-based core further comprises a mercapto group.

39. (New) A fluorescent silica-based nanoparticle comprising a fluorescent organic dye covalently conjugated to an organo-silane compound, wherein the fluorescent silica-based nanoparticle has a diameter from about 10 nm to about 70 nm and is conjugated to a ligand.

40. (New) A fluorescent silica-based nanoparticle comprising:  
a silica-based core comprising a mercapto group;  
a fluorescent compound positioned within the silica-based core; and  
a silica shell surrounding at least a portion of the core, wherein the fluorescent silica-based nanoparticle comprises a diameter between about 10 nm and about 70 nm and is conjugated to a ligand.

41. (New) A fluorescent silica-based nanoparticle comprising:  
a silica-based core comprising a radius between about 1.6 nm and about 3.5 nm;  
a fluorescent compound positioned within the silica-based core; and  
a silica shell surrounding at least a portion of the core, wherein the fluorescent silica-based nanoparticle has a diameter of less than about 70 nm and is conjugated to a ligand.

42. (New) The fluorescent silica-based nanoparticle of claim 43, wherein the radius of the core is between about 2.2 nm and about 2.9 nm.

43. (New) The fluorescent nanoparticle of claim 44, wherein the radius of the core is about 2.2 nm.

44. (New) The fluorescent nanoparticle of claim 44, wherein the radius of the core is about 2.9 nm.